

Armor Rock Evaluation Testing

PREPARED FOR: de maximis, inc.
COPY TO: File
PREPARED BY: CH2M HILL
DATE: December 2, 2013
PROJECT NUMBER: 474468.RA.PM.01

Introduction

Prior to placing the Type A and Type B armor stone, the materials are required to undergo physical and chemical analysis to determine if they meet the Section 02 32 00/Sediment Capping requirements of the technical specifications. The armor stone is sourced from TILCON New York, Inc. Mt Hope quarry located in Wharton Borough, Morris County NJ. The purpose of this technical memorandum is to summarize the results of this testing. Based on the physical and chemical data provided, both the proposed Type A and Type B armor stone are considered acceptable for use as the armor layer for the RM 10.9 cap.

Physical Analysis

The subcontractor is required to perform evaluation tests on stone samples collected from the proposed source under the direction of a registered geologist or registered engineer. The tests to which the stone was to be subjected included petrographic examination (ASTM C 295), bulk specific gravity (SSD), absorption (ASTM C 127), resistance of stone to freezing and thawing (ASTM D 5312), and if argillaceous limestone and sandstone are used, resistance to wetting and drying (ASTM D 5313).

The petrographic examination identified the proposed armor stone as granite gneiss and sedimentary rock with the following mineral composition:

- Potassium Feldspars 45-50%
- Quartz 20-25%
- Hornblende 5-10%
- Plagioclase 5-10%
- Other 3-5% (iron oxide minerals, biotite, chlorite)

The complete results of the petrographic examination are provided as Attachment #1.

The results of the physical testing performed on the source material are also included within Attachment #1 and are summarized in Table 1.

Table 1 – Summary of Physical Testing Results

| Parameter | Technical Requirement | Source Result |
|------------------------------------|---------------------------|----------------|
| Bulk specific gravity | >2.65 | 2.656 |
| Absorption < 2 percent | <2 % | 0.6% |
| pH | - | 8.1* |
| Resistance to Freezing and Thawing | maximum loss < 10 percent | 9.9 |
| Resistance to Wetting and Drying | maximum loss < 1 percent | Not applicable |

*The pH is fairly neutral (8.1) and will not cause high pH in the receiving water (i.e., greater than 9).

Gradation

Gradation was to be conducted on both the Type A and B armor stone in accordance with ASTM D5519. However, the Type A armor stone was determined to be too large for the ASTM D5519 test method. Therefore, the Type A stone was visually inspected for acceptance. The stone supplier and subcontractor inspected an approximate 3 cubic-foot representative sample of a 20,000 yd³ stockpile of the Type A stone. The inspection included measuring the stone at its longest dimension and then weighing the stone using a calibrated electronic scale. The results of the Type A stone inspection as well the result of the Type B gradation analysis are summarized in Tables 2 and 3. The complete results of the testing/inspection are included as Attachment #2.

Table 2 – Type A Stone Gradation Analysis

| | Type A Limits of Stone Weight (lb) for Percentage Lighter by Weight | | | | | | |
|-------------------------|---|-----|-----------------------|-----|-----------------------|-----------------------|--|
| | 100% Lighter by Weight | | 50% Lighter by Weight | | 15% Lighter by Weight | | |
| | Min | Max | Min | Max | Min | Max | |
| Technical Specification | 9 | 23 | 5 | 7 | 1 | 3 | |
| Type A Stone | 21 ^a | | 5 to 7 ^b | | | 1 to 3 ^{c,d} | |

Notes:

- a - 100% (by weight) of Type A stone less than 21 inches in size
- b - 50% (by weight) of Type A stone between 4 and 6 inches in size
- c - 10% lighter by weight
- d - 10% (by weight) of Type A stone is less than approximately 3.5 inches in size

Table 3 – Type B Stone Gradation Analysis

| | | Type B Limits of Stone Weight (lb) for Percentage Lighter by Weight | | | | | |
|-------------------------|------------------|---|------------------|-----------------------|-------------------|-----------------------|-----|
| | | 100% Lighter by Weight | | 50% Lighter by Weight | | 15% Lighter by Weight | |
| | | Min | Max | Min | Max | Min | Max |
| Technical Specification | | 0.8 | 2 | 0.4 | 0.6 | 0.1 | 0.3 |
| Type B Stone | 2.8 ^a | | 1.5 ^b | | 0.55 ^c | | |

Notes:

- a - 100% (by weight) of Type B stone less than 3.5 inches in size
- b - 50% (by weight) of Type B stone less than 2.5 inches in size
- c - 10% (by weight) of Type B stone is less than 2 inches in size

Chemical Analysis

A representative sample of the stone was also analyzed for the US EPA Target Compound List (TCL) +30/Target Analyte List (TAL) parameters, Extractable Petroleum Hydrocarbons (EPH), pH and Hexavalent Chromium. Chemical analysis results indicate that the armor stone meets the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards. The complete results are provided as Attachment #3.

Conclusions and Recommendations

The proposed armor stone meets all of the physical and chemical requirements of the capping technical specifications. The Type B stone gradation is slightly higher than the requirements of the technical specification due to the stone being larger than that specified. However, the slightly larger stone distribution is not a concern and will not impact the long term stability of the cap. Therefore, both the proposed Type A and Type B armor stone are considered acceptable for use as the armor layer for the RM 10.9 cap

Attachment #1
Physical Testing Results

SOR TESTING LABORATORIES, INC.

Geotechnical Engineering-Materials Testing-Forensic Studies

98 Sand Park Rd., Cedar Grove, NJ 07009

(973) 239-6001 Fax (973) 239-8380

Kamil Sor, Ph.D.

Orhun Sor, P.E.

Yilmaz Arhan, Ph.D.

Kenneth Rowbotham, P.E.

Atilla Sencar, P.E.

This report is the confidential property of the Client, and information
Contained may not be published or reproduced without our written permission.

Client: Tilcon, NJ

Project: Information of Client

Subject: Laboratory Tests of Coarse Aggregate Sample

Source: Mt. Hope, NJ

Job No.: 13-255 Report No.: 13-1948 Date: 11/21/13

We present herewith laboratory test results of the coarse aggregate sample received on November 6, 2013. The sample received was identified by client as Core Stone aggregate from Mt. Hope, NJ quarry.

At the clients request, the sample was tested for a series of characteristics and petrographic properties in accordance with the test procedures specified in ASTM-C33 for conformance to NYDOT requirements.

SOR TESTING LABORATORIES, INC.

Tilcon, NJ
Laboratory Tests of Coarse Aggregate Sample
Mt. Hope, New Jersey

Report No.: 13-1948

1. PHYSICAL PROPERTIES

| Property | ASTM Method | Results | ASTM-C33 Requirements |
|--|-------------|---------|-----------------------|
| Water Absorption, % | C-127 | 0.60 | --- |
| Specific Gravity: | C-127 | 2.656 | --- |
| Bulk (SSD) | | 2.683 | --- |
| Apparent | | 2.640 | --- |
| Bulk | | | |
| Unit Weight, lbs/cu. Ft. | C-29 | 94.9 | --- |
| Atterberg Limits | D-4791 | 6.0 | NP |
| L. A. Abrasion, % Loss | C-131 | 24.4 | 35 Max. |
| Elongated Particles, % (5:1 degrees) | D-4791 | 6.0 | 10 Max. (*) |
| Soundness, % Loss (10 cycles) (Freeze/Thaw) | D-5312 | 9.9 | 18 Max. (*) |
| Clay Lumps & Friable and Deleterious Materials | C-33 | 2.0 | 5 Max. |

(*) NY DOT requirements

2. PETROGRAPHIC EXAMINATION

A representative specimen was obtained from the aggregate sample and examined in general conformance with ASTM C295 and NYSDOT Materials Method 28/29. The sample was identified as granite/granitic gneiss. A summary of the test results are presented in Table 1 below:

TABLE -1
Laboratory Test Results

| Material Designation | Lab 10: 13-107 Client's Core Stone % by weight | NYSDOT 703-0201 Requirements Maximum % |
|--------------------------------|---|--|
| Shale and shale like materials | <0.04 | 3.0 |
| Coal/Lignite/Sulfide | <0.05 | 1.0 |
| Clay Lumps or Wood | <0.04 | 0.2 |
| Metal Ore | <0.04 | 3.0 |
| Other Deleterious Materials | <1.0 | 3.0 |
| Total Deleterious Materials | 2.0 | 5.0 |

SOR TESTING LABORATORIES, INC.

Tilcon, NJ
 Laboratory Tests of Coarse Aggregate Sample
 Mt. Hope, New Jersey

Report No.: 13-1948

| SAMPLE ID: Core Stone | |
|--|---|
| IDENTIFICATION: Granite Gneiss + Sedimentary Rock | |
| COLOR: <i>White to medium gray and greenish-gray and brown (weathering particles)</i> | |
| 1. Unstable Materials | Negligible |
| 2. Weathered/Altered Minerals | Hornblende, Feldspars, Biotite |
| 3. Proportion of Euhedral Particles | <0.5% |
| 4. Potentially Alkalai Silica Reactive Materials | Strained quartz |
| 5. Fresh and Dense Particles | ~90% |
| 6. Slight to moderately Weathered Particles | 8-10% (<1% of the particles showed moderate to severe weathering) |
| 7. Particle Shape | Predominantly Angular |
| 8. Particle Surface Texture | Mostly medium grain and gritty. Some washable rock powder. The weathered particles had a reddish brown iron hydroxide |
| 9. Internal Structure | Relatively closely packed. No apparent voids. Varying grain size |
| 10. Mineral Composition (based on total) | Potassium Feldspars 45-50%, Quartz 20-25%, Hornblende 5-10% Plagioclase 5-10%, Other 3-5% (iron oxide minerals, biotite, chlorite) |
| 11. Heterogeneities | Negligible |
| 12. General Physical Condition of the Aggregates | Good |
| 13. Coatings and Incrustations | Most of the weathered particles had partial incrustations of iron hydroxide and discoloration to reddish brown. The weathering of the hornblende and formation of iron hydroxide minerals was observed. Minimal gibbsite and some clays were noted. |
| 14. Constituents Deleterious to Use | Strained quartz particles are potentially alkali silica reactive. Some of the severely weathered particles. |
| 15. Other Conductivity (1:1) Water Absorption | 56 umhos/cm (relatively low in soluble salts) 0.60% |

SOR TESTING LABORATORIES, INC.

Tilcon, NJ
Laboratory Tests of Coarse Aggregate Sample
Mt. Hope, New Jersey

Report No.: 13-1948

CONCLUSIONS

Based on these test results, the following conclusions were drawn:

- The coarse aggregate sample tested meets ASTM C-33 and NY State DOT requirements for parameters tested.
- It is our opinion that the aggregate is suitable for use as rock armor/outfall protection.

Very truly yours,

SOR TESTING LABORATORIES, INC.



Kamil Sor, Ph.D.

President

KS/jh

Cc: (1) Client, Attn. Richard Linton

Attachment #2

Gradation Test Results



Type A

TILCON NEW YORK INC.

PHONE: 973-366-7741 • 625 MT. HOPE ROAD • WHARTON, NEW JERSEY 07885 • FAX: 973-659-3902

11/30/2013

Todd King
Senior Project Manager
Great Lakes Dredge and Dock, LLC
2705 Richmond Tenace
Staten Island, NY 10303

Re: Armor Stone

Todd King,

Tilcon NY Inc. confirms that the Armor stone produced from our Mt. Hope Quarry conforms to section 901 of the *New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction* to the best of our knowledge. The material is defined as virgin Gneiss mined at Mt. Hope Quarry, 625 Mt. Hope Road, Block 20001-Lot 6.01 Wharton Borough, Morris County NJ. The material is identified on the job with Tilcon delivery tickets.

Visual inspection of the Tilcon products referred to as "Core Stone" and "ASTM #1" has been performed taking into account stone density and it is our opinion that the materials are suitable for the customer's requirements relevant to the materials noted as "Type A" and "Type B" respectively. Tilcon has provided a sieve analysis of the ASTM #1 stone, but is unable to provide a similar document for the "Core Stone" as the stone gradations are too large to perform this type of analysis. Instead, Tilcon and GLDD have jointly inspected an approximate 3 cubic-foot representative sample of a 20,000 CY stockpile of the stone. The inspection included measuring the stone at its longest dimension and then weighing the stone using a calibrated electronic scale. The results of the inspection are included on the attached table.

Tilcon NY Inc. has also had the quarry material analyzed under the EPA Target Compound List as required by the LSRP program- *NJDEP Residential Direct Contact Soil Remediation Standards/Clean Fill Criteria*. See attached chemical analysis.

Thank you,

Richard Linton
Quality Control Manager
Tilcon NY Inc.
New Jersey Division

CORE STONE

10"= 21 lbs.
8"= 17 lbs None heavier than 21 lbs. in sample
6"= 12 lbs.
5"= 6 lbs. 50% of the sample between 5 and 7 lbs.
4"= 3.5 lbs.
3.5"= 2.8 lbs. 10% of the sample between 1 to 3 lbs.
3"= 2.1 lbs.

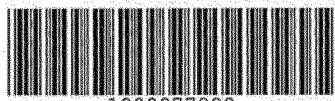


Type B

an Oldcastle® company

Quality Test Report

Plant 06000418-Mt. Hope Quarry
Product ASTM #1-ASTM #1
Specification ASTM #1



1900977999

Sample Information

Sample No 1900977999
Date Sampled 08/09/2013 09:55

Split Sample
 Resample
Lot / Sublot
Quad / Quantity

Sequence
Code

Sampled By Lindsay Csabai
Type Shipping

Method Load-out Face

Location

Test Note

Process

Ledge

Other

Weather

Temp

Gradation Results

Date Completed 08/09/2013 09:55

Tested By Lindsay Csabai

| Unit g | Moist Mass | Dry Mass 55.70 | Wash Mass | Moisture % | Wash Loss % | Procedure | | |
|-----------------|---------------|----------------------|-------------------|------------|-------------|-----------|---------------|---------|
| Sieve | Mass Retained | Cum Mass Retained | Ind % Retained | % Retained | % Passing | Target | Specification | Comment |
| 4" (100mm) | [3.5 lbs.] | 0.0 | 0.0 | 0.0 | 100.0 | | 100-100 | |
| 3 1/2" (90mm) | [2.8 lbs.] | 0.0 | 0.0 | 0.0 | 100.0 | | 90-100 | |
| 2 1/2" (63mm) | [1.5 lbs.] | 28.5 | 28.5 | 51.2 | 51.2 | | 25-60 | |
| 2" (50mm) | [.55 lbs.] | 19.3 | 47.8 | 34.6 | 85.8 | 14.2 | | |
| 1 1/2" (37.5mm) | [.3 lbs.] | 7.3 | 55.1 | 13.1 | 98.9 | 1.1 | 0-15 | |
| 3/4" (19mm) | [no weight] | 0.3 | 55.4 | 0.5 | 99.5 | 0.5 | 0-5 | |
| Pan | | 0.3 | 55.7 | 0.54 | 100.00 | 0.00 | | |

Attachment #3
Chemical Analysis Results

S & S ENVIRONMENTAL SCIENCES, INC.

Environmental Engineering, Testing and Consultation

98 Sand Park Road, Cedar Grove, NJ 07009
Tel (973) 857-7188 Fax (973) 239-8380

Kamil Sor, Ph.D.
Yilmaz Arhan, Ph.D.
Orhun Sor, P.E.
Peter G. Micklus, P.E.
Kenneth J. Rowbotham, P.E.

This report is the confidential property of the Client, and information contained may not be published or reproduced without our written permission.

| | | | |
|-----------------|------------------------------------|-----------------------|-----------|
| Client: | TILCON New York, Inc. | | |
| Project: | Mount Hope, New Jersey | | |
| Subject: | Laboratory Analysis of Stone Fines | | |
| Job No.: | 07-E-34 | Report Number: | 13-E-176R |
| Date: | 07-03-2013 | | |

We present herewith the laboratory test results of one (1) stone fines sample received on June 18, 2013. The sample was collected at Mount Hope Quarry by a representative of TILCON on June 18, 2013.

As requested, the sample was analyzed for the U.S. EPA Target Compound List (TCL)+30/Target Analyte List (TAL) parameters, Extractable Petroleum Hydrocarbons (EPH), pH, and Hexavalent Chromium. The analyses were performed by Integrated Analytical Laboratories, LLC (IAL) (NJDEP Lab ID No. 14751).

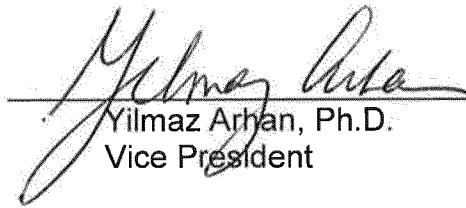
The test results are summarized in Table Nos. 1 through 4. A copy of the IAL sample chain-of-custody form and a copy of the preliminary faxed IAL laboratory summary report are attached.

Based on the laboratory data, the sample meets all of the NJDEP Residential Direct Contact Soil Remediation Standards. Manganese concentration in the sample exceeded the NJDEP Default Impact to Ground Water (IGW) soil screening level. No further evaluation through SPLP leaching is needed for Manganese, since the Ground Water Quality Standard for this metal is secondary and non-health based, and because it is present naturally and not due to a discharge.

If there are any questions or if we can be of further assistance in this matter please call us.

Very truly yours,

S & S ENVIRONMENTAL SCIENCES, INC.



Yilmaz Arhan, Ph.D.
Vice President

YA/ya

Attachments: (1) IAL Laboratory Summary Report and Sample Chain-of-Custody Form
(2) NJDEP Residential Soil Remediation Standards List

cc: (1) Client (Attn: Mr. Steve O'Reilly and Mr. Gino Labbate)

S & S ENVIRONMENTAL SCIENCES, INC.

TILCON New York, Inc.

Re: Mount Hope, NJ Quarry

Laboratory Analysis of Stone Fines

Report No. 13-E-176R

July 3, 2013

Page 2

TABLE 1 - SUMMARY OF LABORATORY TEST RESULTS

| PARAMETERS | SAMPLE #13-105-32 RESULT | NJDEP SOIL REMEDIATION STANDARD(*) |
|--|--|---|
| Organic Compounds | | |
| Volatile Organic Compounds | Methylene chloride=0.00279 B Others Not Detected (See Table 2) | Methylene chloride=34 Others See Attached List |
| Semi-Volatile Organics | Not Detected (See Table 3) | See Attached List |
| Pesticides | Not Detected (See Table 4) | See Attached List |
| PCBs | Not Detected (See Table 4) | Total 0.20 |
| Metals: | | |
| Aluminum | 2,650 | 78,000 |
| Antimony | ND (<0.261) | 31 |
| Arsenic | 0.630 | 19 |
| Barium | 19.3 | 16,000 |
| Beryllium | 0.325 J | 16 |
| Cadmium | ND (<0.131) | 78 |
| Calcium | 3,950 | NA |
| Chromium | 1.44 J | 120,000 |
| Cobalt | 3.08 | 1,600 |
| Copper | 6.13 | 3,100 |
| Iron | 10,200 | NA |
| Lead | ND (<0.131) | 400 |
| Magnesium | 1,710 | NA |
| Manganese | 97.7 | 11,000 |
| Mercury | ND (<0.00561) | 23 |
| Nickel | 1.74 | 1,600 |
| Potassium | 787 | NA |
| Selenium | ND (<1.05) | 390 |
| Silver | ND (<0.131) | 390 |
| Sodium | 141 | NA |
| Thallium | ND (<0.131) | 5 |
| Vanadium | 4.21 | 78 |
| Zinc | 11.9 | 23,000 |
| Others | | |
| Extractable Petroleum Hydrocarbons (EPH) (C9-C40) | 21.6 J | 1,000 |
| Cyanide | ND (<0.509) | 1,600 |
| Hexavalent Chromium | ND (<0.278) | 20 |
| pH, SU | 8.10 | NA |

Results are in mg/kg (milligrams per kilogram) unless otherwise specified.

(*) NJDEP's "Residential Direct Contact Soil Remediation Standards"

ND – Not Detected (< - Indicates less than (the value reported is the Method Detection Limit))

NA – Not Applicable/Not Available

J – The concentration was detected at a value below the Reporting Limit and above the Method Detection Limit

B – Laboratory Blank Contamination

S & S ENVIRONMENTAL SCIENCES, INC.

TILCON New York, Inc.

Re: Mount Hope, NJ Quarry

Laboratory Analysis of Stone Fines

Report No. 13-E-176R

July 3, 2013

Page 3

TABLE 2 - TEST RESULTS FOR VOLATILE ORGANIC COMPOUNDS

| SAMPLING DATE: | 06-18-2013 (Client) | SAMPLE MATRIX: Stone Fines |
|---|--------------------------|------------------------------------|
| PARAMETER | SAMPLE #13-105-32 RESULT | NJDEP SOIL REMEDIATION STANDARD(*) |
| Dichlorodifluoromethane | ND | 490 |
| Chloromethane | ND | 4 |
| Vinyl Chloride | ND | 0.7 |
| Bromomethane | ND | 25 |
| Chloroethane | ND | 220 |
| Trichlorodifluoromethane | ND | 23000 |
| Acrolein | ND | 0.5 |
| 1,1-Dichloroethene | ND | 11 |
| Acetone | ND | 70000 |
| Carbon disulfide | ND | 7800 |
| Methylene Chloride | 0.00279 B | 34 |
| trans-1,2-Dichloroethene | ND | 300 |
| Methyl tert-butyl ether (MTBE) | ND | 110 |
| 1,1-Dichloroethane | ND | 8 |
| cis-1,2-Dichloroethene | ND | 230 |
| 2-Butanone (MEK) | ND | 3100 |
| Bromochloromethane | ND | NA |
| Chloroform | ND | 0.6 |
| 1,1,1-Trichloroethane | ND | 290 |
| Carbon tetrachloride | ND | 0.6 |
| 1,2-Dichloroethane (EDC) | ND | 0.9 |
| Benzene | ND | 2 |
| Trichloroethene (TCE) | ND | 7 |
| 1,2-Dichloropropane | ND | 2 |
| 1,4-Dioxane | ND | NA |
| Bromodichloromethane | ND | 1 |
| cis-1,3-Dichloropropene | ND | NA |
| trans-1,3-Dichloropropene | ND | NA |
| 4-Methyl-2-Pentanone (MIBK) | ND | NA |
| Toluene | ND | 6300 |
| 1,1,2-Trichloroethane | ND | 2 |
| Tetrachloroethene (PCE) | ND | 2 |
| 2-Hexanone | ND | NA |
| Dibromochloromethane | ND | 3 |
| 1,2-Dibromoethane (EDB) | ND | 0.008 |
| Chlorobenzene | ND | 510 |
| Ethylbenzene | ND | 7800 |
| Xylenes (Total) | ND | 12000 |
| Styrene | ND | 90 |
| Bromoform | ND | 81 |
| Isopropylbenzene | ND | NA |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| 1,3-Dichlorobenzene | ND | 5,300 |
| 1,4-Dichlorobenzene | ND | 5 |
| 1,2-Dichlorobenzene | ND | 5,300 |
| 1,2-Dibromo-3-chloropropane | ND | 0.08 |
| 1,2,4-Trichlorobenzene | ND | 73 |
| 1,2,3-Trichlorobenzene | ND | NA |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ND | NA |
| Methyl acetate | ND | 78000 |
| Cyclohexane | ND | NA |
| Methylcyclohexane | ND | NA |
| 1,3-Dichloropropene (cis and trans) | ND | 2 |
| Tentatively Identified Compounds (TICs) | ND | NA |

Results are in mg/kg (milligrams per kilogram) unless otherwise specified.

(*) NJDEP's "Residential Direct Contact Soil Remediation Standards"

ND: Not Detected (see laboratory report for detection limits) NA-Not Applicable/Not Available

J – The concentration was detected at a value below the Reporting Limit and above the Method Detection Limit

B – Laboratory Blank Contamination

S & S ENVIRONMENTAL SCIENCES, INC.

TILCON New York, Inc.

Re: Mount Hope, NJ Quarry

Laboratory Analysis of Stone Fines

Report No. 13-E-176R

July 3, 2013

Page 4

TABLE 3 – TEST RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS

| SAMPLING DATE: | 06-18-2013 (Client) | SAMPLE MATRIX: | Stone Fines |
|----------------|---------------------|----------------|-------------|
|----------------|---------------------|----------------|-------------|

| PARAMETER | SAMPLE #13-105-32 RESULT | NJDEP SOIL REMEDIATION STANDARD(*) |
|------------------------------|-----------------------------|---------------------------------------|
| bis(2-chloroethyl) ether | ND | 0.4 |
| 1,3-Dichlorobenzene | ND | 5300 |
| 1,4-Dichlorobenzene | ND | 5 |
| 1,2-Dichlorobenzene | ND | 5300 |
| Benzyl alcohol | ND | NA |
| bis(2-chloroisopropyl) ether | ND | 23 |
| bis(2-ethylhexyl) phthalate | ND | 35 |
| Hexachloroethane | ND | 35 |
| n-Nitroso-di-n-propylamine | ND | 0.2 |
| Nitrobenzene | ND | 31 |
| Isophorone | ND | 510 |
| 1,2,4-Trichlorobenzene | ND | 73 |
| 4-Chloroaniline | ND | NA |
| Hexachloro-1,3-butadiene | ND | 6 |
| Hexachlorocyclopentadiene | ND | 45 |
| Dimethylphthalate | ND | NA |
| Diethylphthalate | ND | 49,000 |
| 2,4-Dinitrotoluene | ND | 0.7 |
| 2,6-Dinitrotoluene | ND | 0.7 |
| n-Nitrosodiphenylamine | ND | 99 |
| Hexachlorobenzene | ND | 0.3 |
| Butylbenzylphthalate | ND | 1200 |
| 4-Chloro-3-methylphenol | ND | NA |
| 2-Chlorophenol | ND | 310 |
| Di-n-butyl phthalate | ND | 6100 |
| Di-n-octyl phthalate | ND | 2400 |
| 3,3'-Dichlorobenzidine | ND | 1 |
| 2,4-Dichlorophenol | ND | 180 |

Results are in mg/kg (milligrams per kilogram) unless otherwise specified.

(*) NJDEP's "Residential Direct Contact Soil Remediation Standards"

ND - Not Detected (see laboratory report for detection limits)

NA - Not Applicable/Not Available

S & S ENVIRONMENTAL SCIENCES, INC.

TILCON New York, Inc.

Re: Mount Hope, NJ Quarry

Laboratory Analysis of Stone Fines

Report No. 13-E-176R

July 3, 2013

Page 5

TABLE 3 - TEST RESULTS FOR SEMI-VOLATILE ORGANIC COMPOUNDS
(continued)

| SAMPLING DATE: | 06-18-2013 (Client) | SAMPLE MATRIX: | Stone Fines |
|--|-----------------------------|---------------------------------------|-------------|
| PARAMETER | SAMPLE #13-105-32 RESULT | NJDEP SOIL REMEDIATION STANDARD(*) | |
| 2,4-Dimethylphenol | ND | 1200 | |
| 2,4-Dinitrophenol | ND | 120 | |
| 2-Methylphenol (o-Cresol) | ND | 310 | |
| 4-Methylphenol (p-Cresol) | ND | 31 | |
| Pentachlorophenol | ND | 3 | |
| Phenol | ND | 18,000 | |
| 2,4,5-Trichlorophenol | ND | 6100 | |
| 2,4,6-Trichlorophenol | ND | 19 | |
| Benzoic Acid | ND | NA | |
| Acenaphthene | ND | 3400 | |
| Acenaphthylene | ND | NA | |
| Anthracene | ND | 17,000 | |
| Benzo[a]anthracene | ND | 0.6 | |
| Benzo[a]pyrene | ND | 0.2 | |
| Benzo[b]fluoranthene | ND | 0.6 | |
| Benzo[k]fluoranthene | ND | 6 | |
| Carbazole | ND | 24 | |
| Chrysene | ND | 62 | |
| Dibenz[a,h]anthracene | ND | 0.2 | |
| Dibenzofuran | ND | NA | |
| Fluoranthene | ND | 2300 | |
| Fluorene | ND | 2300 | |
| Indeno[1,2,3-cd]pyrene | ND | 0.6 | |
| Naphthalene | ND | 6 | |
| 2-Methylnaphthalene | ND | 230 | |
| Pyrene | ND | 1700 | |
| Benzo[g,h,i]perylene | ND | 380000 | |
| Phenanthrene | ND | NA | |
| Total | ND | NA | |
| Tentatively Identified Compounds (TICs) | ND | NA | |
| Total | ND | NA | |

Results are in mg/kg (milligrams per kilogram) unless otherwise specified.

(*) NJDEP's "Residential Direct Contact Soil Remediation Standards"

ND - Not Detected (see laboratory report for detection limits)

NA - Not Applicable/Not Available

S & S ENVIRONMENTAL SCIENCES, INC.

TILCON New York, Inc.

Re: Mount Hope, NJ Quarry

Laboratory Analysis of Stone Fines

Report No. 13-E-176R

July 3, 2013

Page 6

TABLE 4- TEST RESULTS FOR PESTICIDES AND PCBs

| SAMPLING DATE: | 06-18-2013 (Client) | SAMPLE MATRIX: | Stone Fines |
|----------------|---------------------|----------------|-------------|
|----------------|---------------------|----------------|-------------|

| PARAMETER | SAMPLE #13-105-32 RESULT | NJDEP SOIL REMEDIATION STANDARDS(*) |
|--------------------------------|-----------------------------|--|
| PESTICIDES | | |
| Aldrin | ND | 0.04 |
| 4,4' – DDD | ND | 3 |
| 4,4' – DDE | ND | 2 |
| 4,4' – DDT | ND | 2 |
| Dieldrin | ND | 0.04 |
| Endosulfan I and Endosulfan II | ND | 470 |
| Endosulfan sulfate | ND | 470 |
| Endrin | ND | 23 |
| Heptachlor | ND | 0.1 |
| Heptachlor epoxide | ND | 0.07 |
| alpha-BHC | ND | 0.1 |
| beta-BHC | ND | 0.4 |
| gamma – BHC (Lindane) | ND | 0.4 |
| Methoxychlor | ND | 390 |
| Toxaphene | ND | 0.6 |
| Chlordane (Alpha and Gamma) | ND | 0.2 |
| PCBs | | |
| Aroclor - 1016 | ND | NA |
| Aroclor - 1221 | ND | NA |
| Aroclor - 1232 | ND | NA |
| Aroclor - 1242 | ND | NA |
| Aroclor - 1248 | ND | NA |
| Aroclor - 1254 | ND | NA |
| Aroclor - 1260 | ND | NA |
| Aroclor - 1262 | ND | NA |
| Aroclor - 1268 | ND | NA |
| Total PCBs | ND | 0.20 (TOTAL PCBs) |

Results are in mg/kg (milligrams per kilogram) unless otherwise specified.

(*) NJDEP's "Residential Direct Contact Soil Remediation Standards"

ND - Not Detected (see laboratory report for detection limits)

NA - Not Applicable/Not Available

S & S ENVIRONMENTAL SCIENCES, INC.

Environmental Engineering, Testing and Consultation

98 Sand Park Rd, Cedar Grove, NJ 07009

Tel (973) 857-7188 Fax (973) 239-8380

NJDEP Lab Certification No. 07073

SAMPLE CHAIN OF CUSTODY

| | | |
|---------|---|---------------------------|
| CLIENT | SEVERNCO Environmental / TILCON | SSES PROJECT NO. |
| ADDRESS | 2749 Lock Port Road Niagara Falls, NY. 14805 | TEL. NO. |
| PROJECT | Study Area 7 Sediment Remedy | FAX NO. |
| | | PROJECT LAB ID NO. 13-105 |

| SAMPLE NUMBER | SAMPLING DATE | SAMPLING TIME | SAMPLE TYPE | NO. OF BOTTLES | ANALYSES REQUESTED |
|---------------|---------------|---------------|-------------|----------------|--------------------|
| 32 A | 6/18/13 | 7:00 AM | Loab | 1 | Clean Fill |
| 32 B | 6/18/13 | 7:00 AM | Loab | 1 | Clean Fill |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments: Tilcon NY, NJ division
"Grits" from Mt. Hope Quarry

Field Measurements: pH= Temp.= Flow Rate=

Sample Preservation: Cooled at 4°C H₂SO₄ NaOH

HNO₃

HCl

Sodium Thiosulfate

Other

Sampled By:

Ruth and Lata

RELINQUISHED BY:

Gino Pollio

RECEIVED BY:

M. Huntin

DATE AND TIME:

6-18-13 3:12 pm

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: S & S Environmental

Project: MT. HOPE - 32

Lab Case No.: E13-05736

| Lab ID: | 05736-001 | | |
|-----------------------------|--------------------|----------|---------|
| Client ID: | 13-105-32 | | |
| Matrix: | Soil | | |
| Sampled Date | 6/18/13 | | |
| PARAMETER(Units) | Conc | Q | MDL |
| Volatiles (Units) | <i>(mg/Kg-ppm)</i> | | |
| Methylene chloride | 0.00279 | B | 0.00198 |
| TOTAL VO's: | 0.00279 | B | |
| TOTAL TIC's: | ND | | |
| TOTAL VO's & TIC's: | 0.00279 | B | |
| Semivolatiles - BNA (Units) | <i>(mg/Kg-ppm)</i> | | |
| TOTAL BNA'S: | ND | | |
| TOTAL TIC's: | ND | | |
| TOTAL BNA'S & TIC's: | ND | | |
| PCB's (Units) | <i>(mg/Kg-ppm)</i> | | |
| Aroclor-1016 | ND | 0.00066 | |
| Aroclor-1221 | ND | 0.00066 | |
| Aroclor-1232 | ND | 0.00066 | |
| Aroclor-1242 | ND | 0.00066 | |
| Aroclor-1248 | ND | 0.00066 | |
| Aroclor-1254 | ND | 0.00066 | |
| Aroclor-1260 | ND | 0.00066 | |
| Aroclor-1262 | ND | 0.00066 | |
| Aroclor-1268 | ND | 0.00066 | |
| PCBs | ND | 0.00066 | |
| Pesticides (Units) | <i>(mg/Kg-ppm)</i> | | |
| alpha-BHC | ND | 0.000165 | |
| beta-BHC | ND | 0.000165 | |
| gamma-BHC (Lindane) | ND | 0.000165 | |
| delta-BHC | ND | 0.000165 | |
| Heptachlor | ND | 0.000165 | |
| Aldrin | ND | 0.000165 | |
| Heptachlor epoxide | ND | 0.000165 | |
| Endosulfan I | ND | 0.000165 | |
| 4,4'-DDE | ND | 0.000165 | |
| Dieldrin | ND | 0.000165 | |
| Endrin | ND | 0.000165 | |
| Endosulfan II | ND | 0.000165 | |
| 4,4'-DDD | ND | 0.000165 | |
| Endrin aldehyde | ND | 0.000165 | |
| Endosulfan sulfate | ND | 0.000165 | |
| 4,4'-DDT | ND | 0.000165 | |
| Endrin ketone | ND | 0.000165 | |
| Methoxychlor | ND | 0.000165 | |
| alpha-Chlordane | ND | 0.000165 | |
| gamma-Chlordane | ND | 0.000165 | |
| Toxaphene | ND | 0.00198 | |
| Endosulfan (I and II) | ND | 0.000165 | |
| Chlordane (alpha and gamma) | ND | 0.000165 | |
| NJ-EPH-C40 (Units) | <i>(mg/Kg-ppm)</i> | | |
| C9-C40 | 21.6 | J | 9.07 |

ND = Analyzed for but Not Detected at the MDL

J = The concentration was detected at a value below the RL and above the MDL

B = The compound was detected in the blank and the sample

INTEGRATED ANALYTICAL LABORATORIES, LLC.**SUMMARY REPORT****Client: S & S Environmental****Project: MT. HOPE - 32****Lab Case No.: E13-05736**

| Lab ID: | 05736-001 | | |
|-----------------------------------|--------------------|---|---------|
| Client ID: | 13-105-32 | | |
| Matrix: | Soil | | |
| Sampled Date | 6/18/13 | | |
| PARAMETER(Units) | Conc | Q | MDL |
| Metals (Units) | <i>(mg/Kg-ppm)</i> | | |
| Aluminum | 2650 | | 5.23 |
| Antimony | ND | | 0.261 |
| Arsenic | 0.630 | | 0.261 |
| Barium | 19.3 | | 2.61 |
| Beryllium | 0.325 | J | 0.209 |
| Cadmium | ND | | 0.131 |
| Calcium | 3950 | | 26.1 |
| Chromium | 1.44 | J | 0.523 |
| Cobalt | 3.08 | | 0.523 |
| Copper | 6.13 | | 0.523 |
| Iron | 10200 | | 13.1 |
| Lead | ND | | 0.131 |
| Magnesium | 1710 | | 13.1 |
| Manganese | 97.7 | | 0.261 |
| Mercury | ND | | 0.00561 |
| Nickel | 1.74 | | 0.523 |
| Potassium | 787 | | 13.1 |
| Selenium | ND | | 1.05 |
| Silver | ND | | 0.131 |
| Sodium | 141 | | 26.1 |
| Thallium | ND | | 0.131 |
| Vanadium | 4.21 | | 0.523 |
| Zinc | 11.9 | | 2.09 |
| General Analytical (Units) | | | |
| Hexavalent Chromium(mg/Kg-ppm) | ND | | 0.278 |
| Cyanide, Total(mg/Kg-ppm) | ND | | 0.509 |
| pH/Corrosivity(SU) | 8.10 | | NA |

ND = Analyzed for but Not Detected at the MDL

J = The concentration was detected at a value below the RL and above the MDL

| Sample #: | Field ID: | Lab ID: | Date Sampled: | Depth(ft): | NJDEP SOIL REMEDIATION STANDARDS | | | | | |
|--------------------------------|------------|---------|---------------|------------|----------------------------------|-------------|-----------------------------|---------|--------|-----|
| | | | | | Residential SRS | Non-Res SRS | Default IGW Screening Level | (mg/Kg) | Conc Q | RL |
| | | | | | CAS | (mg/Kg) | (mg/Kg) | (mg/Kg) | | MDL |
| Volatiles (mg/Kg) | | | | | | | | | | |
| Dichlorodifluoromethane | 75-71-8 | 490 | 230000 | 25 | ND | 0.002 | 0.00056 | | | |
| Chloromethane | 74-87-3 | 4 | 12 | NS | ND | 0.002 | 0.00029 | | | |
| Vinyl chloride | 75-01-4 | 0.7 | 2 | 0.005 | ND | 0.002 | 0.00039 | | | |
| Bromomethane | 74-83-9 | 25 | 59 | 0.03 | ND | 0.001 | 0.00048 | | | |
| Chloroethane | 75-00-3 | 220 | 110 | NS | ND | 0.001 | 0.00037 | | | |
| Trichlorofluoromethane | 75-69-4 | 23000 | 340000 | 22 | ND | 0.002 | 0.0003 | | | |
| 1,1-Dichloroethene | 75-35-4 | 11 | 150 | 0.005 | ND | 0.002 | 0.00041 | | | |
| Acetone | 67-64-1 | 70000 | NS | 12 | ND | 0.005 | 0.00055 | | | |
| Carbon disulfide | 75-15-0 | 7800 | 110000 | 4 | ND | 0.001 | 0.00031 | | | |
| Methylene chloride | 75-09-2 | 34 | 97 | 0.007 | 0.00279 | B | 0.002 | 0.00198 | | |
| trans-1,2-Dichloroethene | 156-60-5 | 300 | 720 | 0.4 | ND | 0.002 | 0.00034 | | | |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 110 | 320 | 0.2 | ND | 0.002 | 0.00025 | | | |
| 1,1-Dichloroethane | 75-34-3 | 8 | 24 | 0.2 | ND | 0.001 | 0.0003 | | | |
| cis-1,2-Dichloroethene | 156-59-2 | 230 | 560 | 0.2 | ND | 0.001 | 0.00028 | | | |
| 2-Butanone (MEK) | 78-93-3 | 3100 | 44000 | 0.6 | ND | 0.002 | 0.00029 | | | |
| Bromochloromethane | 74-97-5 | NS | NS | NS | ND | 0.001 | 0.00025 | | | |
| Chloroform | 67-66-3 | 0.6 | 2 | 0.2 | ND | 0.001 | 0.00027 | | | |
| 1,1,1-Trichloroethane | 71-55-6 | 290 | 4200 | 0.2 | ND | 0.001 | 0.00026 | | | |
| Carbon tetrachloride | 56-23-5 | 0.6 | 2 | 0.005 | ND | 0.001 | 0.00025 | | | |
| 1,2-Dichloroethane (EDC) | 107-06-2 | 0.9 | 3 | 0.005 | ND | 0.001 | 0.00022 | | | |
| Benzene | 71-43-2 | 2 | 5 | 0.005 | ND | 0.001 | 0.00027 | | | |
| Trichloroethene | 79-01-6 | 7 | 20 | 0.007 | ND | 0.001 | 0.00034 | | | |
| 1,2-Dichloropropane | 78-87-5 | 2 | 5 | 0.005 | ND | 0.001 | 0.00026 | | | |
| 1,4-Dioxane | 123-91-1 | NS | NS | NS | ND | 0.200 | 0.011 | | | |
| Bromodichloromethane | 75-27-4 | 1 | 3 | 0.005 | ND | 0.001 | 0.00021 | | | |
| cis-1,3-Dichloropropene | 10061-01-5 | NS | NS | NS | ND | 0.001 | 0.00022 | | | |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | NS | NS | NS | ND | 0.001 | 0.00021 | | | |
| Toluene | 108-88-3 | NS | NS | NS | ND | 0.001 | 0.00022 | | | |
| trans-1,3-Dichloropropene | 10061-02-6 | NS | NS | NS | ND | 0.001 | 0.00021 | | | |
| 1,1,2-Trichloroethane | 79-00-5 | 2 | 6 | 0.01 | ND | 0.001 | 0.00025 | | | |
| Tetrachloroethene | 127-18-4 | 2 | 5 | 0.005 | ND | 0.001 | 0.00027 | | | |
| 2-Hexanone | 591-78-6 | NS | NS | NS | ND | 0.001 | 0.00021 | | | |
| Dibromochloromethane | 124-48-1 | 3 | 8 | 0.005 | ND | 0.001 | 0.00021 | | | |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 0.008 | 0.04 | 0.005 | ND | 0.001 | 0.0002 | | | |
| Chlorobenzene | 108-90-7 | 510 | 7400 | 0.4 | ND | 0.001 | 0.00028 | | | |
| Ethylbenzene | 100-41-4 | 7800 | 110000 | 8 | ND | 0.001 | 0.00028 | | | |
| Total Xylenes | 1330-20-7 | 12000 | 170000 | 12 | ND | 0.002 | 0.0008 | | | |
| Styrene | 100-42-5 | 90 | 260 | 2 | ND | 0.001 | 0.00022 | | | |
| Bromoform | 75-25-2 | 81 | 280 | 0.02 | ND | 0.001 | 0.00024 | | | |

Standards are based upon published regulatory information.
Users are encouraged to consult appropriate regulatory sources for current values and updates.
IAL assumes no responsibility for the accuracy of these values.

| | | | | | | | | | | |
|--|----------|-------|-------|-------|---------|----|----|-------|---------|---------|
| Isopropylbenzene | 98-82-8 | NS | NS | NS | NS | NS | NS | ND | 0.001 | 0.00029 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 1 | 3 | 12 | 0.005 | ND | ND | 0.001 | 0.00023 | |
| 1,3-Dichlorobenzene | 541-73-1 | 5300 | 59000 | 1 | ND | ND | ND | 0.001 | 0.00024 | |
| 1,4-Dichlorobenzene | 106-46-7 | 5 | 13 | 1 | ND | ND | ND | 0.001 | 0.0002 | |
| 1,2-Dichlorobenzene | 95-50-1 | 5300 | 59000 | 11 | ND | ND | ND | 0.001 | 0.00028 | |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | 0.08 | 0.2 | 0.005 | ND | ND | ND | 0.001 | 0.0002 | |
| 1,2,4-Trichlorobenzene | 120-82-1 | 73 | 820 | 0.4 | ND | ND | ND | 0.001 | 0.00026 | |
| 1,2,3-Trichlorobenzene | 87-61-6 | NS | NS | NS | ND | ND | ND | 0.001 | 0.00032 | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 76-13-1 | NS | NS | NS | ND | ND | ND | 0.002 | 0.00037 | |
| Methyl acetate | 79-20-9 | 78000 | NS | 14 | ND | ND | ND | 0.002 | 0.00022 | |
| Cyclohexane | 110-82-7 | NS | NS | NS | ND | ND | ND | 0.002 | 0.00039 | |
| Methylcyclohexane | 108-87-2 | NS | NS | NS | ND | ND | ND | 0.001 | 0.00036 | |
| 1,3-Dichloropropene (cis- and trans-) | 542-75-6 | 2 | 7 | 0.005 | ND | ND | ND | 0.001 | 0.00022 | |
| TOTAL VOC's: | | NS | NS | NS | 0.00279 | B | NA | NA | NA | |
| TOTAL TIC's: | | NS | NS | NS | 0.00279 | B | NA | NA | NA | |
| TOTAL VOC's & TIC's: | | NS | NS | NS | 0.00279 | B | NA | NA | NA | |

| | Semivolatiles - BNA (mg/kg) | | | Conc | Q | RL | MDL |
|------------------------------|------------------------------------|-------|--------|-------------|----------|-----------|------------|
| Benzaldehyde | 100-52-7 | 6100 | 68000 | NS | ND | 0.032 | 0.024 |
| Phenol | 108-95-2 | 18000 | 210000 | 5 | ND | 0.032 | 0.014 |
| Bis(2-chloroethyl) ether | 111-44-4 | 0.4 | 2 | 0.2 | ND | 0.032 | 0.00965 |
| 2-Chlorophenol | 95-57-8 | 310 | 2200 | 0.5 | ND | 0.032 | 0.00708 |
| 2-Methylphenol | 95-48-7 | 310 | 3400 | NS | ND | 0.032 | 0.00965 |
| Bis(2-chloroisopropyl) ether | 108-60-1 | 23 | 67 | 3 | ND | 0.032 | 0.00805 |
| 4-Methylphenol ** | 106-44-5 | 31 | 340 | NS | ND | 0.032 | 0.00901 |
| 621-64-7 | 0.2 | 0.3 | 0.2 | ND | 0.032 | 0.00933 | |
| N-Nitrosodi-n-propylamine | 98-86-2 | 2 | 5 | 2 | ND | 0.032 | 0.00901 |
| Acetophenone | 98-75-5 | NS | NS | NS | ND | 0.032 | 0.00772 |
| Hexachloroethane | 67-72-1 | 35 | 140 | 0.2 | ND | 0.032 | 0.00933 |
| Nitrobenzene | 98-95-3 | 31 | 340 | 0.2 | ND | 0.032 | 0.00676 |
| Isophorone | 78-59-1 | 510 | 2000 | 0.2 | ND | 0.032 | 0.011 |
| 2-Nitrophenol | 88-75-5 | NS | NS | NS | ND | 0.032 | 0.00998 |
| 2,4-Dimethylphenol | 105-67-9 | 1200 | 14000 | 0.7 | ND | 0.032 | 0.014 |
| Bis(2-chloroethoxy) methane | 111-91-1 | NS | NS | NS | ND | 0.032 | 0.015 |
| 2,4-Dichlorophenol | 120-83-2 | 180 | 2100 | 0.2 | ND | 0.032 | 0.00698 |
| Naphthalene | 91-20-3 | 6 | 17 | 16 | ND | 0.032 | 0.00805 |
| 4-Chloroaniline | 106-47-8 | NS | NS | NS | ND | 0.032 | 0.00837 |
| Hexachlorobutadiene | 87-68-3 | 6 | 25 | 0.6 | ND | 0.032 | 0.011 |
| Caprolactam | 105-60-2 | 31000 | 340000 | 8 | ND | 0.032 | 0.00734 |
| 4-Chloro-3-methylphenol | 59-50-7 | NS | NS | NS | ND | 0.032 | 0.011 |
| 2-Methylnaphthalene | 91-57-6 | 230 | 2400 | 5 | ND | 0.032 | 0.00772 |
| Hexachlorocyclopentadiene | 77-47-4 | 45 | 110 | 210 | ND | 0.032 | 0.00901 |
| 2,4,6-Trichlorophenol | 88-06-2 | 19 | 74 | 0.2 | ND | 0.032 | 0.00805 |
| 2,4,5-Trichlorophenol | 95-95-4 | 6100 | 68000 | 44 | ND | 0.032 | 0.012 |
| 1,1'-Biphenyl | 92-52-4 | 3100 | 34000 | 90 | ND | 0.032 | 0.012 |
| 2-Chloronaphthalene | 91-58-7 | NS | NS | NS | ND | 0.032 | 0.00772 |
| 2-Nitroaniline | 88-74-4 | 39 | 23000 | NS | ND | 0.032 | 0.00965 |
| Dimethyl phthalate | 131-11-3 | NS | NS | NS | ND | 0.032 | 0.00869 |
| 2,6-Dinitrotoluene | 606-20-2 | 0.7 | 3 | NS | ND | 0.032 | 0.017 |
| Acenaphthylene | 208-96-8 | NS | 300000 | NS | ND | 0.032 | 0.00644 |
| 3-Nitroaniline | 99-09-2 | NS | NS | 37000 | 74 | ND | 0.032 |
| Acenaphthene | 83-32-9 | 3400 | 1400 | 0.3 | ND | 0.032 | 0.00827 |
| 2,4-Dinitrophenol | 51-28-5 | 120 | NS | NS | ND | 0.032 | 0.00965 |
| 4-Nitrophenol | 100-02-7 | NS | NS | NS | ND | 0.032 | 0.00998 |
| 2,4-Dinitrotoluene | 121-14-2 | 0.7 | 3 | NS | ND | 0.032 | 0.00772 |
| Dibenzofuran | 132-64-9 | NS | NS | NS | ND | 0.032 | 0.00901 |
| Diethyl phthalate | 84-66-2 | 49000 | 550000 | 57 | ND | 0.032 | 0.011 |
| Fluorene | 86-73-7 | 2300 | 24000 | 110 | ND | 0.032 | 0.00837 |
| 4-Chlorophenyl phenyl ether | 7005-72-3 | NS | NS | NS | ND | 0.032 | 0.00965 |
| 4-Nitroaniline | 100-01-6 | NS | NS | NS | ND | 0.032 | 0.00579 |
| 1,2,4,5-Tetrachlorobenzene | 95-94-3 | NS | NS | NS | ND | 0.032 | 0.011 |
| 2,3,4,6-Tetrachlorophenol | 58-90-2 | NS | NS | NS | ND | 0.032 | 0.011 |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | 6 | 68 | 0.3 | ND | 0.032 | 0.020 |
| N-Nitrosodiphenylamine | 86-30-6 | 99 | 390 | 0.2 | ND | 0.032 | 0.00579 |

Standards are based upon published regulatory information.
Users are encouraged to consult appropriate regulatory sources for current values and updates.
IAL assumes no responsibility for the accuracy of these values.

| | | NS | NS | NS | NS | ND |
|---------------------------------------|------------|--------|--------|------|-------|---------|
| 4-Bromophenyl phenyl ether | 101-55-3 | 0.3 | 1 | 0.2 | 0.032 | 0.0074 |
| Hexachlorobenzene | 118-74-1 | 0.3 | 1 | 0.2 | 0.032 | 0.00998 |
| Atrazine | 1912-24-9 | 210 | 2400 | 0.2 | ND | 0.032 |
| Pentachlorophenol | 87-86-5 | 3 | 10 | 0.3 | ND | 0.00837 |
| Phenanthrene | 85-01-8 | NS | 300000 | NS | ND | 0.011 |
| Anthracene | 120-12-7 | 17000 | 30000 | 1500 | ND | 0.00743 |
| Carbazole | 86-74-8 | 24 | 96 | NS | ND | 0.032 |
| Di-n-butyl phthalate | 84-74-2 | 6100 | 68000 | 620 | ND | 0.012 |
| Fluoranthene | 206-44-0 | 2300 | 24000 | 840 | ND | 0.032 |
| Pyrene | 129-00-0 | 1700 | 18000 | 550 | ND | 0.00898 |
| Butyl benzyl phthalate | 85-68-7 | 1200 | 14000 | 150 | ND | 0.032 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 1 | 4 | 0.2 | ND | 0.00869 |
| Benzol[alanthracene | 56-55-3 | 0.6 | 2 | 0.5 | ND | 0.032 |
| Chrysene | 218-01-9 | 62 | 230 | 52 | ND | 0.00943 |
| Bis(2 ethylhexyl) phthalate | 117-81-7 | 35 | 140 | 790 | ND | 0.032 |
| Di-n-octyl phthalate | 117-84-0 | 2400 | 27000 | 3300 | ND | 0.012 |
| Benzol[fluoranthene | 205-99-2 | 0.6 | 2 | 2 | ND | 0.00933 |
| Benzol[k]fluoranthene | 207-08-9 | 6 | 23 | 16 | ND | 0.032 |
| Benzo[a]pyrene | 50-32-8 | 0.2 | 0.2 | 0.2 | ND | 0.017 |
| Indeno[1,2,3-cd]pyrene | 193-39-5 | 0.6 | 2 | 5 | ND | 0.018 |
| Dibenz[a,h]anthracene | 53-70-3 | 0.2 | 0.2 | 0.5 | ND | 0.032 |
| Benzol[g,h,i]perylene | 191-24-2 | 380000 | 30000 | NS | ND | 0.025 |
| Dinitrotoluene (2,4- and 2,6-) | 25321-14-6 | 0.7 | 3 | 0.2 | ND | 0.032 |
| TOTAL BNAs: | | NS | NS | NS | ND | 0.00998 |
| TOTAL TIC's: | | NS | NS | NS | ND | NA |
| TOTAL BNAs & TIC's: | | NS | NS | NS | ND | NA |

| PCBs (mg/Kg) | | Conc | Q | RL | MDL |
|--------------|-------------|------|----|---------|---------|
| Aroclor-1016 | 12674-11-2 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1221 | 111104-28-2 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1232 | 111141-16-5 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1242 | 53469-21-9 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1248 | 12672-29-6 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1254 | 11097-69-1 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1260 | 11096-82-5 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1262 | 37324-23-5 | NS | ND | 0.00165 | 0.00066 |
| Aroclor-1268 | 11100-14-4 | NS | ND | 0.00165 | 0.00066 |
| PCBs | 1336-36-3 | 0.2 | 1 | 0.2 | 0.00165 |

| Pesticides (mg/Kg) | | | | | | | | | | Conc | Q | RL | MDL |
|-----------------------------|------------|------|------|-------|----|---------|----------|--|--|------|---------|----------|-----|
| alpha-BHC | 319-84-6 | 0.1 | 0.5 | 0.002 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| beta-BHC | 319-85-7 | 0.4 | 2 | 0.002 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| gamma-BHC (Lindane) | 58-89-9 | 0.4 | 2 | 0.002 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| delta-BHC | 319-86-8 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Hepachlor | 76-44-8 | 0.1 | 0.7 | 0.3 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Aldrin | 309-00-2 | 0.04 | 0.2 | 0.1 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Heptachlor epoxide | 1024-57-3 | 0.07 | 0.3 | 0.009 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endosulfan I | 959-98-8 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| 4,4'-DDE | 72-55-9 | 2 | 9 | 12 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Dieldrin | 60-57-1 | 0.04 | 0.2 | 0.003 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endrin | 72-20-8 | 23 | 340 | 0.6 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endosulfan II | 33213-65-9 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| 4,4'-DDD | 72-54-8 | 3 | 13 | 3 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endrin aldehyde | 7421-93-4 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endosulfan sulfate | 1031-07-8 | 470 | 6800 | 1 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| 4,4'-DDT | 50-29-3 | 2 | 8 | 7 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Endrin ketone | 53494-70-5 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Methoxychlor | 72-43-5 | 380 | 5700 | 100 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| alpha-Chlordane | 5103-71-9 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Gamma-Chlordane | 5103-74-2 | NS | NS | NS | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Toxaphene | 8001-35-2 | 0.6 | 3 | 0.2 | ND | 0.00413 | 0.00198 | | | ND | 0.00033 | 0.000165 | |
| Endosulfan (I and II) | 115-29-7 | 470 | 6800 | 2 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |
| Chlordane (alpha and gamma) | 57-74-9 | 0.2 | 1 | 0.03 | ND | 0.00033 | 0.000165 | | | ND | 0.00033 | 0.000165 | |

| NJ-EPH-C40 (mg/Kg) | IALC9C40 | NS | NS | NS | Conc | Q | RL | MDL |
|--------------------|----------|----|----|----|------|---|------|------|
| C9-C40 | | | | | 21.6 | J | 36.3 | 9.07 |

| Metals (mg/Kg) | | | | | | | | | | Conc | Q | RL | MDL |
|-----------------------|-----------|-------|--------|------|-------|-------|-------|---------|-------|-------------|----------|-----------|------------|
| Aluminum | 7429-90-5 | 78000 | NS | 3900 | 6 | ND | 2650 | 10.5 | 5.23 | | | | |
| Antimony | 7440-36-0 | 31 | 450 | 19 | 19 | 0.630 | ND | 1.05 | 0.261 | | | | |
| Arsenic | 7440-38-2 | 19 | 19 | 1300 | 19.3 | 0.325 | J | 0.523 | 0.261 | | | | |
| Barium | 7440-39-3 | 16000 | 59000 | 140 | 0.5 | ND | ND | 10.5 | 2.61 | | | | |
| Beryllium | 7440-41-7 | 16 | 140 | 1 | 0.325 | J | 0.366 | 0.209 | | | | | |
| Cadmium | 7440-43-9 | 78 | 78 | 1 | ND | ND | 0.523 | 0.131 | | | | | |
| Calcium | 7440-70-2 | NS | NS | NS | 3950 | 3950 | 52.3 | 26.1 | | | | | |
| Chromium | 7440-47-3 | NS | NS | NS | 1.44 | J | 2.09 | 0.523 | | | | | |
| Cobalt | 7440-48-4 | 1600 | 590 | 59 | 3.08 | ND | ND | 2.09 | 0.523 | | | | |
| Copper | 7440-50-8 | 3100 | 45000 | 7300 | 6.13 | ND | ND | 2.09 | 0.523 | | | | |
| Iron | 7439-89-6 | NS | NS | NS | 10200 | 10200 | 26.1 | 13.1 | | | | | |
| Lead | 7439-92-1 | 400 | 800 | 69 | ND | ND | 0.523 | 0.131 | | | | | |
| Magnesium | 7439-95-4 | NS | NS | NS | 1710 | 1710 | 52.3 | 13.1 | | | | | |
| Manganese | 7439-96-5 | 11000 | 5900 | 42 | 97.7 | 97.7 | 1.05 | 0.261 | | | | | |
| Mercury | 7439-97-6 | 23 | 65 | 0.1 | ND | ND | 0.012 | 0.00561 | | | | | |
| Nickel | 7440-02-0 | 1600 | 23000 | 31 | 1.74 | 1.74 | 1.05 | 0.523 | | | | | |
| Potassium | 7440-09-7 | NS | NS | 787 | 787 | 52.3 | 13.1 | | | | | | |
| Selenium | 7782-49-2 | 390 | 5700 | 7 | ND | ND | 2.09 | 1.05 | | | | | |
| Silver | 7440-22-4 | 390 | 5700 | 1 | ND | ND | 0.523 | 0.131 | | | | | |
| Sodium | 7440-23-5 | NS | NS | NS | 141 | 141 | 105 | 26.1 | | | | | |
| Thallium | 7440-28-0 | 5 | 79 | 3 | ND | ND | 0.523 | 0.131 | | | | | |
| Vanadium | 7440-62-2 | 78 | 1100 | NS | 4.21 | 4.21 | 2.09 | 0.523 | | | | | |
| Zinc | 7440-66-6 | 23000 | 110000 | 600 | 11.9 | 600 | 2.09 | 2.09 | | | | | |

| | | | | | | | Conc | Q | RL | MDL |
|---|------------|------|-------|----|--|--|-------------|----------|-----------|------------|
| General Analytical | | | | | | | | | | |
| Hexavalent Chromium-mg/Kg | 18540-29-9 | 240 | 20 | NS | | | ND | 1.02 | 0.278 | |
| Cyanide, Total-mg/Kg | 57-12-5 | 1600 | 23000 | 13 | | | ND | 1.02 | 0.509 | |
| pH/Corrosivity-SU | SRP 6 | NS | NS | NS | | | 8.10 | NA | NA | |
| NUDEP Soil Remediation Standards; Remediation Standards N.J.A.C. 7:26E, May 2012 | | | | | | | | | | |
| BOLD Conc | | | | | | | | | | |
| | | | | | | | | | | |
| BOLD RL | | | | | | | | | | |
| BOLD MDL | | | | | | | | | | |
| NS = No Standard Available | | | | | | | | | | |
| ND = Analyzed for but Not Detected at the MDL | | | | | | | | | | |
| J = The concentration was detected at a value below the RL and above the MDL | | | | | | | | | | |
| All qualifiers on individual Volatiles & Semivolatiles are carried down through summation | | | | | | | | | | |
| B = The compound was detected in the blank and the sample | | | | | | | | | | |



PROJECT INFORMATION

E13-05736: MT. HOPE - 32

To: Dr. Yilmaz Arhan
 S & S Environmental
 Fax: 1(973) 239-8380
 EMail: angelal@sorlabs.com; Alig@sorlabs.com

Report To

S & S Environmental
 98 Sand Park Road
 Cedar Grove, NJ 07009
 Attn: Dr. Yilmaz Arhan

Bill To

S & S Environmental
 98 Sand Park Road
 Cedar Grove, NJ 07009
 Attn: Dr. Yilmaz Arhan

| Report Format | P.O. # | Received At Lab | TPHC Due | Verbal Due | Hardcopy Due |
|---------------|-----------|----------------------|-------------|---------------|-----------------|
| Reduced | 13-105-32 | Jun 19, 2013 @ 13:00 | NA | Jul 03, 2013 | Jul 11, 2013 * |

* Any *Conditional or Hold* status will delay final hardcopy report sent date.

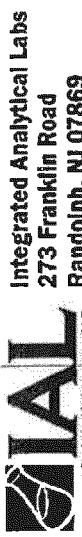
Diskette Req. Not Required

** QC Requirement (must meet): NJ IGW

| Lab ID | Client Sample ID | Depth | Sampling Time | Matrix | Unit | Field pH/Temp |
|-----------|------------------|-------|----------------|--------|-------------|---------------|
| 05736-001 | 13-105-32 | NA | 06/18/13@07:00 | Soil | mg/Kg (ppm) | |

| Sample # | Test | Status | QA Method | TAT | Holding Time Expires |
|----------|-----------------------------|---------|--------------------|-----------|----------------------|
| 001 | TCL VO + 15 | Analyze | 8260B | STD/2 WKS | 7/2/2013 |
| | TCL BNA + 15 | Analyze | 8270C | STD/2 WKS | 7/2/2013 |
| | TCL PCB | Analyze | 8082 | STD/2 WKS | 7/2/2013 |
| | NJ-EPH-C40 | Analyze | Method 10.08 Rev 3 | STD/2 WKS | 7/2/2013 |
| | NJ-EPH-Fractionated | Hold | Method 10.08 Rev 3 | STD/2 WKS | 7/2/2013 |
| | TCL Pesticides | Analyze | 8081A | STD/2 WKS | 7/2/2013 |
| | TAL Metals | Analyze | 6020/7471A | STD/2 WKS | 7/16/2013 |
| | pH/Corrosivity | Analyze | 9045C | STD/2 WKS | 7/16/2013 |
| | Cr-VI (Hexavalent Chromium) | Analyze | 3060A/7196A | STD/2 WKS | 7/18/2013 |
| | Cyanide, Total | Analyze | 9012B | STD/2 WKS | 7/2/2013 |





Integrated Analytical Laboratories
Randolph, NJ 07869

CUSTOMER INFO

Company: S+S
Address:
Telephone #: *Some*

REPORTING INFO

REPORT TO:

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved. Turnaround Time starts the following day if samples rec'd at lab > 5PM.

*Lab notification is required for RUSH TAT prior to sample arrival. RUSH TAT IS NOT GUARANTEED WITHOUT LAB APPROVAL. **RUSH SURCHARGES WILL APPLY IF ABLE TO ACCOMMODATE

| | | | | |
|--|--|---|---|---------------------------------|
| FAX # | PHC - MUST CHOOSE NJ EPH DRO (5 day TAT) NJ EPH - C40 (5 day TAT) | Rush TAT Charge** 24 hr - 100%... 48 hr - 75%... 72 hr - 50%... 96 hr - 35%... S day - 25%... 6-9 day 10% | Report Format NJ Results Only NJ Cat A (N) Reduced NYSCDC | EDDS |
| INVOICE TO: Address: Alt: | DRO-S015 (3-5 day TAT) QAM025 Verbal/Spec: Std 2 wk unless otherwise specified | NJ EPH Fractionated (5 day TAT) DRO-S015 (3-5 day TAT) | NI Regulator NY Cat B 15% Surecharge applies | lab approved custom EDD |
| EMAIL Address: Sampled by: COMPLETED BY IAL: | <i>Same</i> | | | Other (describe) NO EDDED REQ'D |
| FBI Sampling Equipment Rental | | | | |

Hard Copy: Std 3 week * Other call for price

SAMPLE INFORMATION

| Client ID | Depth (ft only) | Sampling | | | | | | Matrix | Container | # | TAN # | EDD | HC# | HCL | NOH | MHOH | NSO3 | NO | MHSO4 | H2O2 | Acet | | | |
|-------------|-----------------|----------|------|--------|------|----|----|--------|-----------|---|-------|-----|-----|-----|-----|------|------|----|-------|------|------|--|--|--|
| | | Date | Time | Matrix | Site | SL | St | | | | | | | | | | | | | | | | | |
| 13-105 - 32 | 6/9/13 | 7am | S | 5 | 1 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | |
|-------------------------|------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|------|--|
| Known Hazard: Yes or No | Cone. Expected: Low Med High | Carrier (check all) | IAL Counter | Client Courier | FedEx UPS | Date | Time | Comments: |
| Describe: | | | | | | | | NY TOTGS NY CS1 NY Part 375 Restricted NY Part 375 Unrestricted |
| Relinquished by: | <i>JG</i> | <i>Signature/Company</i> | <i>Signature/Company</i> | <i>Signature/Company</i> | <i>Signature/Company</i> | 6/10/13 | 9:45 | |
| Re-requested by: | <i>JG</i> | | | | | | | |
| Retained by: | <i>JG</i> | | | | | | | |
| Relinquished by: | <i>JG</i> | | | | | | | |
| Retained by: | <i>JG</i> | | | | | | | |
| Page: | <i>5</i> | | | | | | | |

LAB COPIES - WHITE & YELLOW, CLIENT COPY - PINK

07/10/2013 rev

INTEGRATED ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIPT VERIFICATION

CASE NO: E 13

05736

CLIENT:

STS

COOLER TEMPERATURE: 2° - 6°C:

(See Chain of Custody)

Comments

COC: **COMPLETE** / INCOMPLETE

KEY

- = YES/NA
 = NO

VOA received: Encore IGW - Methanol
 (check one) Terra Core No Preservative

- Bottles Intact
 no-Missing Bottles
 no-Extra Bottles

- Sufficient Sample Volume
 no-headspace/bubbles in VOs
 Labels intact/correct
 pH Check (exclude VOs)¹
 Correct bottles/preservative
 Sufficient Holding/Prep Time¹
 Multiphasic Sample
 Sample to be Subcontracted
 Chain of Custody is Clear

¹ All samples with "Analyze Immediately" holding times will be analyzed by this laboratory past the holding time. This includes but is not limited to the following tests: pH, Temperature, Free Residual Chlorine, Total Residual Chlorine, Dissolved Oxygen, Sulfite.

ADDITIONAL COMMENTS:

SAMPLE(S) VERIFIED BY:

INITIAL

DATE 6/19/13

CORRECTIVE ACTION REQUIRED:

YES

(SEE BELOW)

NO

If COC is NOT clear, **STOP** until you get client to authorize/clarify work.

CLIENT NOTIFIED:

YES

Date/ Time:

NO

PROJECT CONTACT:

SUBCONTRACTED LAB:

DATE SHIPPED:

ADDITIONAL COMMENTS:

VERIFIED/TAKEN BY:

INITIAL

DATE

6.20.13

REV 03/2013

NOTE: THIS IS A COURTESY COPY OF THIS RULE. ALL OF THE DEPARTMENT'S RULES ARE COMPILED IN TITLE 7 OF THE NEW JERSEY ADMINISTRATIVE CODE.

APPENDIX 1 - SOIL REMEDIATION STANDARDS TABLES

Table 1A - Residential Direct Contact Health Based Criteria and Soil Remediation Standards (mg/kg)

| Contaminant | CAS No. | Ingestion-Dermal Health Based Criterion | Inhalation Health Based Criterion | Soil PQL | Residential Direct Contact Soil Remediation Standard |
|--|-----------|---|-----------------------------------|----------|--|
| Acenaphthene | 83-32-9 | 3,400 | NA | 0.2 | 3,400 |
| Acenaphthylene | 208-96-8 | NA | NA | 0.2 | NA |
| Acetone (2-Propanone) | 67-64-1 | 70,000 | NA | 0.01 | 70,000 |
| Acetophenone | 98-86-2 | 6,100 | 2 | 0.2 | 2 |
| Acrolein | 107-02-8 | 39 | 0.5 | 0.5 | 0.5 |
| Acrylonitrile | 107-13-1 | 1 | 0.9 | 0.5 | 0.9 |
| Aldrin | 309-00-2 | 0.04 | 5 | 0.002 | 0.04 |
| Aluminum | 7429-90-5 | 78,000 | NA | 20 | 78,000 |
| Anthracene | 120-12-7 | 17,000 | 380,000 | 0.2 | 17,000 |
| Antimony | 7440-36-0 | 31 | 360,000 | 6 | 31 |
| Arsenic | 7440-38-2 | 0.4 | 980 | 1 | 19* |
| Atrazine | 1912-24-9 | 210 | NA | 0.2 | 210 |
| Barium | 7440-39-3 | 16,000 | 910,000 | 20 | 16,000 |
| Benzaldehyde | 100-52-7 | 6,100 | NA | 0.2 | 6100 |
| Benzene | 71-43-2 | 3 | 2 | 0.005 | 2 |
| Benzidine | 92-87-5 | 0.002 | 0.004 | 0.7 | 0.7 |
| Benzo(a)anthracene (1,2-Benzanthracene) | 56-55-3 | 0.6 | 38,000 | 0.2 | 0.6 |
| Benzo(a)pyrene | 50-32-8 | 0.06 | 3,800 | 0.2 | 0.2 |
| Benzo(b)fluoranthene (3,4-Benzofluoranthene) | 205-99-2 | 0.6 | 38,000 | 0.2 | 0.6 |
| Benzo(ghi)perylene | 191-24-2 | NA | 380,000 | 0.2 | 380,000 |
| Benzo(k)fluoranthene | 207-08-9 | 6 | 38,000 | 0.2 | 6 |
| Beryllium | 7440-41-7 | 16 | 1,800 | 0.5 | 16 |
| 1,1'-Biphenyl | 92-52-4 | 3,100 | NA | 0.2 | 3,100 |
| Bis(2-chloroethyl)ether | 111-44-4 | 0.4 | 0.6 | 0.2 | 0.4 |
| Bis(2-chloroisopropyl)ether | 108-60-1 | 2,400 | 23 | 0.2 | 23 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 | 35 | NA | 0.2 | 35 |
| Bromodichloromethane (Dichlorobromomethane) | 75-27-4 | 10 | 1 | 0.005 | 1 |
| Bromoform | 75-25-2 | 81 | 98 | 0.005 | 81 |
| Bromomethane (Methyl bromide) | 74-83-9 | 110 | 25 | 0.005 | 25 |
| bromide) | | | | | |
| 2-Butanone (Methyl ethyl ketone) (MEK) | 78-93-3 | 3,100 | NA | 0.01 | 3,100 |
| Butyl benzyl phthalate | 85-68-7 | 1,200 | NA | 0.2 | 1,200 |
| Cadmium | 7440-43-9 | 78 | 1,000 | 0.5 | 78 |
| Caprolactam | 105-60-2 | 31,000 | NA | 0.2 | 31,000 |
| Carbazole | 86-74-8 | 24 | 740,000 | 0.2 | 24 |
| Carbon disulfide | 75-15-0 | 7,800 | NA | 0.5 | 7,800 |
| Carbon tetrachloride | 56-23-5 | 7 | 0.6 | 0.005 | 0.6 |

NOTE: THIS IS A COURTESY COPY OF THIS RULE. ALL OF THE DEPARTMENT'S RULES
ARE COMPILED IN TITLE 7 OF THE NEW JERSEY ADMINISTRATIVE CODE.

| Contaminant | CAS No. | Ingestion-Dermal Health Based Criterion | Inhalation Health Based Criterion | Soil PQL | Residential Direct Contact Soil Remediation Standard |
|---|------------|---|-----------------------------------|----------|--|
| Chlordane (alpha and gamma) | 57-74-9 | 0.2 | 42,000 | 0.002 | 0.2 |
| Chlorobenzene | 108-90-7 | 510 | NA | 0.005 | 510 |
| Chloroethane (Ethyl chloride) | 75-00-3 | 220 | NA | 0.005 | 220 |
| Chloroform | 67-66-3 | 780 | 0.6 | 0.005 | 0.6 |
| Chloromethane (Methyl chloride) | 74-87-3 | NA | 4 | 0.005 | 4 |
| 2-Chlorophenol (o-Chlorophenol) | 95-57-8 | 310 | 910 | 0.2 | 310 |
| Chrysene | 218-01-9 | 62 | 380,000 | 0.2 | 62 |
| Cobalt | 7440-48-4 | 1,600 | 9,100 | 5 | 1,600 |
| Copper | 7440-50-8 | 3,100 | NA | 3 | 3,100 |
| Cyanide | 57-12-5 | 1,600 | NA | 3 | 1,600 |
| 4,4'-DDD | 72-54-8 | 3 | 61,000 | 0.003 | 3 |
| 4,4'-DDE | 72-55-9 | 2 | 670 | 0.003 | 2 |
| 4,4'-DDT | 50-29-3 | 2 | 44,000 | 0.003 | 2 |
| Dibenz(a,h)anthracene | 53-70-3 | 0.06 | 3,500 | 0.2 | 0.2 |
| Dibromochloromethane (Chlorodibromomethane) | 124-48-1 | 8 | 3 | 0.005 | 3 |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | 0.3 | 0.08 | 0.005 | 0.08 |
| 1,2-Dibromoethane | 106-93-4 | 0.008 | 0.1 | 0.005 | 0.008 |
| 1,2-Dichlorobenzene (o-Dichlorobenzene) | 95-50-1 | 5,300 | NA | 0.005 | 5,300 |
| 1,3-Dichlorobenzene (m-Dichlorobenzene) | 541-73-1 | 5,300 | NA | 0.005 | 5,300 |
| 1,4-Dichlorobenzene (p-Dichlorobenzene) | 106-46-7 | 610 | 5 | 0.005 | 5 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 1 | 3 | 0.2 | 1 |
| Dichlorodifluoromethane | 75-71-8 | 16,000 | 490 | 0.005 | 490 |
| 1,1-Dichloroethane | 75-34-3 | 510 | 8 | 0.005 | 8 |
| 1,2-Dichloroethane | 107-06-2 | 5 | 0.9 | 0.005 | 0.9 |
| 1,1-Dichloroethene | 75-35-4 | 11 | 61 | 0.005 | 11 |
| 1,2-Dichloroethylene (cis) (c-1,2-Dichloroethylene) | 156-59-2 | 780 | 230 | 0.005 | 230 |
| 1,2-Dichloroethylene (trans) (t-1,2-Dichloroethylene) | 156-60-5 | 1,300 | 300 | 0.005 | 300 |
| 2,4-Dichlorophenol | 120-83-2 | 180 | NA | 0.2 | 180 |
| 1,2-Dichloropropane | 78-87-5 | 9 | 2 | 0.005 | 2 |
| 1,3-Dichloropropene (cis and trans) | 542-75-6 | 6 | 2 | 0.005 | 2 |
| Dieldrin | 60-57-1 | 0.04 | 1 | 0.003 | 0.04 |
| Diethyl phthalate | 84-66-2 | 49,000 | NA | 0.2 | 49,000 |
| 2,4-Dimethyl phenol | 105-67-9 | 1,200 | NA | 0.2 | 1,200 |
| Di-n-butyl phthalate | 84-74-2 | 6,100 | NA | 0.2 | 6,100 |
| 4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol) | 534-52-1 | 6 | 730,000 | 0.3 | 6 |
| 2,4-Dinitrophenol | 51-28-5 | 120 | NA | 0.3 | 120 |
| 2,4-Dinitrotoluene | 121-14-2 | 0.7 | 6 | 0.2 | 0.7 |
| 2,6-Dinitrotoluene | 606-20-2 | 0.7 | 2 | 0.2 | 0.7 |
| 2,4-Dinitrotoluene/2,6-Dinitrotoluene (mixture) | 25321-14-6 | 0.7 | NA | 0.2 | 0.7 |
| Di-n-octyl phthalate | 117-84-0 | 2,400 | NA | 0.2 | 2,400 |
| 1,2-Diphenylhydrazine | 122-66-7 | 0.6 | 5 | 0.7 | 0.7 |

NOTE: THIS IS A COURTESY COPY OF THIS RULE. ALL OF THE DEPARTMENT'S RULES
ARE COMPILED IN TITLE 7 OF THE NEW JERSEY ADMINISTRATIVE CODE.

| Contaminant | CAS No. | Ingestion-Dermal Health Based Criterion | Inhalation Health Based Criterion | Soil PQL | Residential Direct Contact Soil Remediation Standard |
|---|-----------|---|-----------------------------------|----------|--|
| Endosulfan I and Endosulfan II (alpha and beta) | 115-29-7 | 470 | NA | 0.003 | 470 |
| Endosulfan sulfate | 1031-07-8 | 470 | NA | 0.003 | 470 |
| Endrin | 72-20-8 | 23 | NA | 0.003 | 23 |
| Ethyl benzene | 100-41-4 | 7,800 | NA | 0.005 | 7,800 |
| Fluoranthene | 206-44-0 | 2,300 | NA | 0.2 | 2,300 |
| Fluorene | 86-73-7 | 2,300 | NA | 0.2 | 2,300 |
| alpha-HCH (alpha-BHC) | 319-84-6 | 0.1 | 0.7 | 0.002 | 0.1 |
| beta-HCH (beta-BHC) | 319-85-7 | 0.4 | 8,000 | 0.002 | 0.4 |
| Heptachlor | 76-44-8 | 0.1 | 6 | 0.002 | 0.1 |
| Heptachlor epoxide | 1024-57-3 | 0.07 | 5 | 0.002 | 0.07 |
| Hexachlorobenzene | 118-74-1 | 0.3 | 1 | 0.2 | 0.3 |
| Hexachloro-1,3-butadiene | 87-68-3 | 6 | 12 | 0.2 | 6 |
| Hexachlorocyclopentadiene | 77-47-4 | 370 | 45 | 0.2 | 45 |
| Hexachloroethane | 67-72-1 | 35 | 83 | 0.2 | 35 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.6 | 38,000 | 0.2 | 0.6 |
| Isophorone | 78-59-1 | 510 | NA | 0.2 | 510 |
| Lead | 7439-92-1 | 400 | 44,000 | 1 | 400 |
| Lindane (gamma-HCH) (gamma-BHC) | 58-89-9 | 0.4 | 3 | 0.002 | 0.4 |
| Manganese | 7439-96-5 | 11,000 | 91,000 | 2 | 11,000 |
| Mercury | 7439-97-6 | 23 | 27 | 0.1 | 23 |
| Methoxychlor | 72-43-5 | 390 | NA | 0.02 | 390 |
| Methyl acetate | 79-20-9 | 78,000 | NA | 0.005 | 78,000 |
| Methylene chloride (Dichloromethane) | 75-09-2 | 46 | 34 | 0.005 | 34 |
| 2-Methylnaphthalene | 91-57-6 | 230 | NA | 0.17 | 230 |
| 2-Methylphenol (o-Creosol) | 95-48-7 | 310 | NA | 0.2 | 310 |
| 4-Methylphenol (p-Creosol) | 106-44-5 | 31 | NA | 0.2 | 31 |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 780 | 110 | 0.005 | 110 |
| Naphthalene | 91-20-3 | 2,400 | 6 | 0.2 | 6 |
| Nickel (Soluble salts) | 7440-02-0 | 1,600 | 360,000 | 4 | 1,600 |
| 2-Nitroaniline | 88-74-4 | NA | 39 | 0.3 | 39 |
| Nitrobenzene | 98-95-3 | 31 | 160 | 0.2 | 31 |
| N-Nitrosodimethylamine | 62-75-9 | 0.01 | 0.02 | 0.7 | 0.7 |
| N-Nitrosodi-n-propylamine | 621-64-7 | 0.07 | 0.2 | 0.2 | 0.2 |
| N-Nitrosodiphenylamine | 86-30-6 | 99 | NA | 0.2 | 99 |
| Pentachlorophenol | 87-86-5 | 3 | 590 | 0.3 | 3 |
| Phenanthrene | 85-01-8 | NA | NA | 0.2 | NA |
| Phenol | 108-95-2 | 18,000 | NA | 0.2 | 18,000 |
| Polychlorinated biphenyls (PCBs) | 1336-36-3 | 0.2 | 20 | 0.03 | 0.2 |
| Pyrene | 129-00-0 | 1,700 | NA | 0.2 | 1,700 |
| Selenium | 7782-49-2 | 390 | NA | 4 | 390 |
| Silver | 7440-22-4 | 390 | NA | 1 | 390 |

NOTE: THIS IS A COURTESY COPY OF THIS RULE. ALL OF THE DEPARTMENT'S RULES ARE COMPILED IN TITLE 7 OF THE NEW JERSEY ADMINISTRATIVE CODE.

| Contaminant | CAS No. | Ingestion-Dermal Health Based Criterion | Inhalation Health Based Criterion | Soil PQL | Residential Direct Contact Soil Remediation Standard |
|---|-----------|---|-----------------------------------|----------|--|
| Styrene | 100-42-5 | 16,000 | 90 | 0.005 | 90 |
| Tertiary butyl alcohol (TBA) | 75-65-0 | 1,400 | 4,800 | 0.1 | 1,400 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 10 | 1 | 0.005 | 1 |
| Tetrachloroethylene (PCE) (Tetrachloroethylene) | 127-18-4 | 8 | 2 | 0.005 | 2 |
| Thallium | 7440-28-0 | 5 | 360,000 | 3 | 5 |
| Toluene | 108-88-3 | 6,300 | NA | 0.005 | 6,300 |
| Toxaphene | 8001-35-2 | 0.6 | 70 | 0.2 | 0.6 |
| 1,2,4-Trichlorobenzene | 120-82-1 | 73 | NA | 0.005 | 73 |
| 1,1,1-Trichloroethane | 71-55-6 | 290 | NA | 0.005 | 290 |
| 1,1,2-Trichloroethane | 79-00-5 | 31 | 2 | 0.005 | 2 |
| Trichloroethylene (TCE) (Trichloroethylene) | 79-01-6 | 21 | 7 | 0.005 | 7 |
| Trichlorofluoromethane | 75-69-4 | 23,000 | NA | 0.005 | 23,000 |
| 2,4,5-Trichlorophenol | 95-95-4 | 6,100 | NA | 0.2 | 6,100 |
| 2,4,6-Trichlorophenol | 88-06-2 | 19 | 340 | 0.2 | 19 |
| Vanadium | 7440-62-2 | 78 | NA | 5 | 78 |
| Vinyl chloride | 75-01-4 | 2 | 0.7 | 0.005 | 0.7 |
| Xylenes | 1330-20-7 | 12,000 | NA | 0.005 | 12,000 |
| Zinc | 7440-66-6 | 23,000 | NA | 6 | 23,000 |

NA = Standard not available

* The direct contact standard for arsenic is based on natural background

CHROMIUM SOIL CLEANUP CRITERIA

September 2008 Revised April 2010¹

The Department did not develop soil remediation standards for trivalent or hexavalent chromium as part of its Remediation Standards rules at N.J.A.C. 7:26D. The Department was awaiting the release of the final report from the National Toxicology Program (NTP) study evaluating hexavalent chromium as an oral carcinogen prior to proposing soil remediation standards. The NTP report was released in August 2008. The Department is reviewing the report and will make a determination regarding the adoption of remediation standards for chromium. Until such time, the Department will continue to use the following soil cleanup criteria for trivalent and hexavalent chromium as guidance.

Soil Cleanup Criteria for Chromium

| Residential (mg/kg) | | | | | | |
|---------------------|------------|------------------|------------|-----------------------------------|----------|-------------------------------------|
| Contaminant | CAS No. | Ingestion-Dermal | Inhalation | Allergic Contact Dermatitis (ACD) | Soil PQL | Residential Criterion |
| Trivalent Chromium | 16065-83-1 | 120,000 | NA | NA | 2 | 120,000 |
| Hexavalent Chromium | 18540-29-9 | 240 | 270 | Site-specific determination | 2 | 240 or ACD value whichever is lower |

| Non-Residential (mg/kg) | | | | | | |
|-------------------------|------------|------------------|------------|-----------------------------|----------|---------------------------|
| Contaminant | CAS No. | Ingestion-Dermal | Inhalation | Allergic Contact Dermatitis | Soil PQL | Non-Residential Criterion |
| Trivalent Chromium | 16065-83-1 | NA | NA | NA | 2 | Not Regulated |
| Hexavalent Chromium | 18540-29-9 | 6,100 | 20 | Site-specific determination | 2 | 20 |

NA = Standard not available

¹ This revision corrects the CAS numbers that were mistakenly used for trivalent and hexavalent chromium in the September 2008 version. The CAS numbers were inadvertently switched.

Impact to ground water soil remediation standards must be developed on a site-specific basis for chromium. For Class II ground water, the ground water quality standard is 70 ug/l measured as total chromium but assuming that it is all in the form of hexavalent chromium.

In addition to the cleanup criteria listed above, all remedial actions at sites that have hexavalent chromium must comply with Commissioner Jackson's memorandum dated February 8, 2007. A copy of this memorandum can be found on the Department web site at

<http://www.state.nj.us/dep/dsr/chromium/crmorlift200702.pdf>

More information about the Department chromium work group and chromium research efforts are available on the NJDEP web site at <http://www.state.nj.us/dep/dsr/chromium> .